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## MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF VASSAR COLLEGE

### XVI. THE EFFECT OF AREA ON THE PLEASANTNESS OF COLORS

By DOROTHY CLARK, MARY S. GOODELL, and M. F. WASHBURN

The arrangement of apparatus in the experiments to be described was as follows. Two sets of colored paper squares were provided, one set being 5 cm. a side, the other 25 cm. a side. The small squares were pasted, the large ones fastened with small wire clips, to cardboard squares of the same size as the paper, in order to give them stiffness. The colors used were from the Bradley series and comprised the following: saturated violet, blue, green, yellow, orange, and red, with the lighter tint and the darker shade of each. For every color there were two squares, a larger and a smaller one. In performing an experiment one of the colored squares was suspended by means of wire so that it was seen against a background of the gray laboratory wall about a meter and a half away, and the observer sat at a distance of one and a half meters from the square, which was hung at about the level of her eyes. This arrangement was suggested by Dr. E. Murray as being likely, by rendering the background indefinite, to lessen its influence. The observer at a signal looked at the colored square for ten seconds and recorded her judgment of its pleasantness or unpleasantness in numerical terms, using the numbers 1 to 7 to indicate the following affective grades: very unpleasant, moderately unpleasant, slightly unpleasant, indifferent, slightly pleasant, moderately pleasant, very pleasant. The colors were shown in irregular order, which was, however, kept constant for all observers. A large and a small square of the same color were never shown in immediate succession, as our object was to obtain independent judgments of the affective value of each square, not comparisons of one with another. Nearly all of the observations were taken upon bright days. The observers were twenty-three in number, all women and all but three college students.

The results were treated in two ways. First, the number of observers who assigned a higher affective value to the larger area of each color was counted and compared with the number of those who assigned a lower value to the larger area. This method took no account of the degree of the preference, that is, of how much greater, numerically expressed, the observer's estimate was of the pleasantness of one area as compared with that of the other. The following conclusions were drawn from this method of considering the results. Among *saturated colors*, red was the only one which the majority of the observers preferred in large rather than in small area. All the others were preferred by more observers in the smaller area, though the majority in the cases of yellow and violet was slight. In the case of all of the *tints*, a slight majority preferred the larger area. In the case of all the *shades* the larger area was preferred, though the majority was small for green and violet.

Secondly, the numerical values assigned by all the observers to the large area of a color were added, and divided by the sum of the numerical values assigned by all the observers to the small area of the same color. This proceeding gave the ratio of the total affective values of the two areas of a given color. The following facts resulted from a study of the figures thus

obtained. In *saturated colors*, the smaller area is pleasanter except in the case of saturated red, where the larger area is pleasanter. All the *tints* showed slightly higher affective values for the larger areas. In the case of the *shades* there was a more marked preference for the larger areas except in the case of green.

We may conclude, then, that under the experimental conditions described (1) *saturated colors are preferred in smaller area, with the exception of saturated red, which is preferred in larger area*; (2) *the larger area of tints is slightly preferred*; and (3) *the larger area of shades is preferred, the preference being least in the cases of green and violet*.

There was no correspondence between the absolute affective value of a color and the preference for it in larger or smaller area. It may be noted that in this study as in the preceding ones, the highest absolute affective value was that of the blue tint and the next highest that of saturated red, also that yellow and orange had the lowest affective values among saturated colors, tints, and shades alike. Twelve of the twenty-three observers in this study were also observers in the study on An Effect of Fatigue on Judgments of the Affective Value of Colors.

#### XVII. FLUCTUATIONS IN THE AFFECTIVE VALUE OF COLORS DURING FIXATION FOR ONE MINUTE.

By DOROTHY CRAWFORD and M. F. WASHBURN

The materials used in this experiment consisted of pieces of the Bradley colored papers, 2.9 cm. square. This size was used in the present study, as in some of our other studies on the affective value of colors, for the reason that it can be conveniently cut from the sample books issued by the Bradley Company. Eighteen colors were used: saturated violet, blue, green, yellow, orange, and red, and the lightest tint and darkest shade of each. Each piece of paper was laid on a white ground before the observer, who was asked to express her judgment as to its pleasantness or unpleasantness by using one of the numbers from one to seven, in the ordinary way. The observer was further asked to look steadily at the color for an interval of one minute, measured by the experimenter, and to report by means of the appropriate numbers any changes in the affective value of the color. At the end of the period of fixation she was asked to give the reasons for the changes which had occurred. The same proceeding was repeated for each of the eighteen colors, in random order. Fourteen observers worked on the problem; all, as usual, women, and nearly all students. Eight of the observers had had practice in introspection. Several of them made the experiment more than once, at considerable intervals, so that the total number of experiments performed was twenty-seven.

For most of the observers some fluctuation did occur during the one minute period: the number of colors with which no fluctuation took place varied from fourteen, out of the eighteen, to none, and averaged between four and five. Our principal interest was in the causes which produced the changes in affective value. These changes may be roughly divided into two groups: *alterations due to changes in the color itself, and alterations due to purely mental causes*.

Under the first head, two obvious factors suggest themselves: adaptation and the presence of a negative after-image, due to shifting of fixation, in the neighborhood of the color. The effects of adaptation were variously described as 'fading,' 'dulling,' 'getting dirty,' 'getting darker.' The most important purely mental cause for change in the pleasantness or unpleasantness of a color lay in the occurrence of associated ideas. These were most frequently of definite things, such as violets or wall-paper; sometimes of